

A BALL**COPY**Introduction

This invention relates to balls for use in sports and recreation. The ball has a particular application in bat and ball sports of the kind where the ball is delivered to a batter who attempts to hit the ball and it would be convenient to hereinafter describe the invention in relation to that particular application. It is to be understood that the invention has wider application.

Background of the Invention

10 Bat and ball sports of the foregoing kind generally involve a contest between the batter and the ball deliverer, with the general object of the ball deliverer being to deliver the ball in such a manner that the batter misses or mishits the ball. One method used to frustrate the batter is to curve or swing the ball during flight from the ball deliverer to the batter. An experienced baseball pitcher can make a  
15 baseball curve towards or away from a batter provided the ball is pitched with sufficient speed and horizontal rotation. For example, a ball pitched at 115 kilometres per hour rotating horizontally at 1800 rpm should move about 0.5 metres from a straight path between the pitcher's mound and the batting plate. Similarly, an experienced cricket bowler bowling a ball between 105 and 120  
20 kilometres per hour with its seam angle between 15° to 40° to the direction of travel having the shinier of the two halves of the cricket ball presenting a leading face, while rotating about its seam, will swing towards the rougher side. Quite naturally, combining these requirements with the general requirement of pitching the ball to pass over the batting plate, or bowling the ball at the cricket stumps, is  
25 beyond the average player.

Whilst the specifications of a baseball/cricket ball are set according to the rules of the sport, there are situations, such as in practice or a social game, where a strict adherence is not mandatory. It would be advantageous in these situations to  
30 provide a ball which facilitated a pitcher/bowler to curve/swing the ball.

Summary of Invention

According to the invention there is provided a ball for use in sport or recreation to be delivered through air, the ball is manufactured to include a smooth portion on one side of the ball having a relatively smooth surface, and a rough portion on the opposite side of the ball having a relatively rough surface, the smooth portion covering between 55 and 75% of the surface of the ball, a seam located entirely on the smooth portion which seam includes a plurality of rows of imitation stitches extending proud of the surface of the smooth portion, wherein when the ball is delivered through the air the ball deviates from an expected trajectory towards the side having the smooth surface.

It is preferred that the ball include a core with the smooth portion and rough portion attached to the core by attaching means. It is preferred that the attaching means be a flexible adhesive solution. The core may be hollow or solid and formed from an elastomer, polyurethane or cork.

It is further preferred that the smooth portion covers between 55% of the surface of the ball.

It is further preferred that the smooth surface of the smooth portion be formed from a different material than the rough surface of the rough portion. It is preferred that the smooth surface be formed from an elastomer or synthetic material whilst the rough surface be formed from nap or felt.

Alternatively, the smooth surface of the smooth portion and the rough surface of the rough portion may be formed from the same material, that preferred material being polyurethane. In this preferred embodiment the rough portion preferably includes a plurality of dimples located over the rough surface, wherein the size of the dimples range between 4 to 10 mm in diameter and 2 to 7.5 mm in depth.

In cricket, swinging the ball towards the shiny, smooth surface is called reverse swing. Generally for reverse swing to be achievable the required ball is a cricket ball of the first class variety i.e. a ball with a thin, extra seam running across each hemisphere at right angles to the main seam. The ball must be worn, and  
5 delivered at speeds really only obtainable by the elite, professional bowler. This explains why only a couple of dozen players in the history of the game have ever been able to do it consistently. The invention enables reverse swing to be achieved at speeds well within the reach of the average social participant at around 50 kilometres an hour and lower. Furthermore it is unnecessary to alter  
10 the ball in play, as had previously been required for reverse swing to be achieved.

Terms such as rough and smooth must be interpreted in the context of the invention as described in the specification. More specifically, regard is to be had to the effect the surface of the ball has on the flow of air when interpreting the  
15 terms rough and smooth.

It will be convenient to hereinafter describe the invention in greater detail by reference to the accompanying drawings which illustrate five example embodiments of the invention. The particularity of these drawings and the related  
20 description is not to be understood as superseding the generality of the broad identification of the invention as given in the preceding part of this specification.

#### Brief Description of the Invention

Fig. 1 is an illustration in diagrammatic form of a ball according to an embodiment  
25 of this invention.

Fig. 2 is an illustration in diagrammatic form of the ball from Fig. 1 including a straight seam.

Fig. 3 is an illustration in diagrammatic form of the ball from Fig. 1 including a curved Yin/Yan type seam.

Fig. 4 is an illustration in diagrammatic form of a ball according to a second embodiment of this invention.

Fig. 5 is an illustration in diagrammatic form of the ball from Fig. 1 including a circumferentially extending raised keel.

#### 10 Detailed Description of Preferred Embodiments

Fig. 1 shows an example embodiment of a ball 1 according to the invention. The ball 1 includes a core (not shown) which is preferably hollow but may alternatively be solid. The core is spherical and preferably formed from an elastomer. The elastomer can be any suitable composition, however, it would be advantageous for the composition to facilitate the ball mimicking the weight and rebound characteristics of a genuine baseball/cricket/tennis ball. In particular it has been found advantageous that the ball be well balanced in terms of weight. Referring still to Figure 1, the outer surface of the ball 1 includes a relatively smooth portion 2 on one side of the ball 1, and a relatively rough portion 3 on the opposite side of the ball 1. It is preferred, but not essential, that the two portions 2 and 3 are of substantially the same size (in terms of area), and each may form approximately 50% of the outer surface of the ball 1. Alternatively either portions 2, 3 may cover between 25% to 75% of the ball 1, with ratios of 55/45 to 65/35 being found most suitable.

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Either one or both of the portions 2 and 3 may be formed separate from the core, and any such separately formed portion may be attached to the core using a flexible adhesive solution or any other suitable attaching means. The smooth portion 2 should be relatively smooth and the rough portion 3 be relatively rough so that relatively different fluid flow characteristics will develop across the two surfaces when the ball is delivered through air causing the ball to deviate from an expected straight or normal trajectory in a direction of the smooth portion.

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The smooth portion 2 and rough portion 3 may be formed from any suitable material. It is preferred that the smooth portion 2 be formed from a composition including 48.9% natural rubber, 40.8% calcium, 1.6% esteric, 2.9% DP oil, 2.4% zinc powder, 0.9% sulfur, 0.9% MBT, 1.6% white factor. These components are  
5 mixed, cut into squares measuring approximately 4cm x 4cm x 0.8 cm, placed into a mould of specific design and pressed into a hollow semi-spherical shape. At the completed stage the smooth portion 2 can be covered on its external surface with any suitable substance such as silicon, but this is not essential.

10 In the embodiment illustrated in Figs. 1 to 3, the rough portion 3 is formed by tennis ball nap or felt which is formed by known processes. The production of the tennis ball nap does not form part of the invention.

Fig. 2 shows another example embodiment of the ball 1 which includes a straight  
15 seam 4 similar to the type of stitched seam used on a leather cricket ball. The straight seam 4 may be proud of the surface of the ball 1 or be flush with the surface of the ball 1. The seam 4 will preferably include three rows of imitation stitches on either side of the ball 1, but may be applied to one side only. It should  
20 be appreciated that the seam 4 may not necessarily be in the form of three rows of stitches on either portion but rather may have all stitches on one portion. Inclusion of the seam 4 may require the smooth portion 2 to cover up to 65% of the surface of the ball, but this is not essential.

Fig. 3 shows a further example embodiment of the ball 1 which includes a curved  
25 seam 5 similar to the Yin and Yan type seam used on tennis balls and baseballs. The curved seam 5 may be proud of the surface flush with the surface of the ball 1 and applied to one or both portions of the ball.

Whilst not illustrated it should be appreciated that the ball may include a  
30 combination of the features shown in Figures 2 and 3. More specifically, the ball may include the combination of a cricket ball seam with the Yin and Yan type seams.



In the embodiment illustrated in Fig. 4 the rough portion 3 is formed from a material substantially identical to the smooth portion 2 previously described with the addition of dimples 6. The dimples 6 may be of any shape or configuration, however, dimples ranging from 4 mm to 10 mm in diameter and 2 mm to 7.5 mm in depth have been found suitable. It is not essential that the dimples be round or concave but rather they may be any other shape such as for example, hexagonal or convex. This embodiment may also include some of the features from Figures 2 and 3, namely the straight seam 4 or Yin and Yan type seam 5 or a combination of the both.

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The embodiment illustrated in Figure 5 is of the ball 1 including a raised keel 7. The raised keel 7 extends proud of the remainder of the surface of the ball 1. The raised keel 7 facilitates retention of the ball 1 rotating about an axis perpendicular to the keel 7. This will in turn facilitate delivering the ball 1 in a suitable manner for it to deviate from the expected trajectory. The keel 7 can be used in conjunction with elastomer/nap ball embodiment from Figures 1 to 3 or dimpled ball embodiment from Figure 4.

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Finally, it is to be understood that various alterations, modifications and/or additions may be introduced into the construction and arrangement of the parts previously described without departing from the spirit or ambit of the invention.

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